followed the fall of the Roman Empire," says Mr. Spencer, "nothing to be called science existed. But when, along with gradual reorganisation, the re-genesis of science began, it began as in earlier instances among the cultured men—the priesthood." The man of science and the philosopher have gradually differentiated from the clerical class, one to deal with the concrete and the other to be concerned with abstract matters, and now the distinction between the two is tolerably definite. Simultaneously a subdivision of the body of scientific men has gone on, until we reach these days of minute specialisation. And finally, we have the combination of the units in such institutions as the Royal Society and British Association, and in the serial scientific publications which are general in their scope. In addition to the admirable article summarised in the foregoing, Mr. Spencer contributes to the *Contemporary* a brief note in reply to Prof. Weismann.

A suggestive paper, by Dr. A. R. Wallace, on "The Expressiveness of Speech," appears in the *Fortnightly*. The paper contains a number of interesting facts which point to mouth-gesture as a factor in the origin of language. Here is Dr. Wallace's idea: "In our own language, and probably in all others, a considerable number of the most familar words are so constructed as to proclaim their meaning more or less distinctly, sometimes by means of imitative sounds, but also, in a large number of cases, by the shape or the movements of the various parts of the mouth used in pronouncing them, and by peculiarities in breathing or in vocalisation, which may express a meaning quite independent of mere sound-imitation." Anthropologists and philologists should be interested in the many facts which Dr. Wallace has brought together in support of his view.

Limits of space prevent us from giving more than brief descriptions of the remaining articles of scientific interest in the magazines received. In *Science Progress*, Mr. F. H. Neville traces recent progress in the study of alloys; galvanotropism in tadpoles is described by Dr. A. Waller, F.R.S.; the chromatophores of animals, by Mr. W. Garstang; the space relation of animals, by Dr. A. Eiloart; and the synthesis of proteids, by Prof. W. D. Halliburton, F.R.S. *Chambers's Journal* has short popular papers on "Horseless Carriages," "New Methods of Illumination," and "Cotton-Seed Oil." In *Good Words* we notice an article on "Falconry," by Mr. R. B. Lodge, illustrated by two photographs from life—one showing a peregrine and partridge, and the other a goshawk and rabbit. The two plates are finely engraved, but we think their value would have been greater had they been photographic reproductions from the original negatives. The *Humanitarian* is distinguished by a psychical article entitled "Dynamic Thought," by Prof. W. F. Barrett; and the *National Review* has a paper in which Selbornians will find pleasure, by the Hon. Mrs. R. Boyle. In addition to the magazines named in the foregoing, we have received the *Sunday Magazine* and *Longman's*.

UNIVERSITY AND EDUCATIONAL INTELLIGENCE.

CAMBRIDGE.—Five candidates, namely, R. A. Berry, G. Joyce, H. C. Sheringham, W. M. Tod, and B. N. Wale, have been successful in the recent examination in the science and art of agriculture, and have received the University diploma.

Mr. Charles Smith, Master of Sidney Sussex College, and author of several much-used mathematical text-books, was on October 1 admitted to the office of Vice-Chancellor for the current academical year. The outgoing Vice-Chancellor, Mr. A. Austen Leigh, in his parting address to the Senate, referred in sympathetic terms to the loss sustained by the University in the death of Prof. Cayley and of Prof. Babington. He announced that the latter had bequeathed to the University his large and valuable collection of plants. A part of the address was devoted to a description of the difficulties, chiefly financial, which have attended the inception of the Sedgwick Memorial Museum of Geology. The satisfactory progress made with the extension of the Cavendish Laboratory, now approaching completion, was made a matter of congratulation.

Two scholarships in Natural Science, one of £70 and one of £40 a year, will be competed for at Sidney Sussex College on December 12 to 14. Candidates are to make preliminary application to the tutor, Mr. G. M. Edwards.

The late Prof. Babington has left to the University his botanical library as well as his valuable collection of plants.

Mr. H. F. Baker, of St. John's, and Mr. J. E. Edwards, of Sydney, have been appointed the Moderators, and Mr. R. A. Herman, of Trinity, and Mr. H. W. Richmond, of King's, the Examiners for the Mathematical Tripos of 1896.

Dr. Glaisher has been appointed an Elector to the Isaac Newton Studentship in Astronomy.

A complete series of lectures for agricultural students, under the Cambridge and Counties Agricultural Education Scheme, has been arranged for three terms of the academical year. The syllabus is published in the *University Reporter* of October 8.

THE first Entrance Scholarship in Natural Science, of the value of £150, into St. Thomas's Hospital Medical School has been awarded to Mr. Frank B. Skerrett; the second, of the value of £60, being divided between Messrs. Walter B. Fry, George W. Hare, and Alfred B. Lindsey, bracketed equal. The Entrance Scholarship, value £50, for students from the Universities, has been awarded to Mr. Percy W. G. Sargent, St. John's College, Cambridge.

AT Guy's Hospital, the Entrance Scholarship in Science, of the value of £150, has been awarded to Mr. P. W. L. Camps, and the Second Entrance Scholarship in Science, of the value of £60, has been awarded to Mr. S. Hodgson.

THE Treasury has decided that the annual grant of which King's College, London, was deprived under the late Government may be restored to the college next year without any stipulation as regards tests.

SCIENTIFIC SERIALS.

American Meteorological Journal, September.—Synchronous or simultaneous geographical distribution of hourly wind velocities in the United States, by Dr. F. Waldo. This article is part of a memoir prepared for the U.S. Weather Bureau, and is supplementary to one which appeared in the *Journal* for July (NATURE, p. 335). Charts are drawn for midnight and noon, for the extreme months of January and July, for about the centre of the United States, and afford a comprehensive view of the synchronous wind conditions and relations as regards the average velocities. This method of representation obviates the necessity of a lengthy text.—The origin and work of marine meteorology, by Lieut. W. H. Beehler, U.S.N. The author deals more particularly with the history and development of this service in the United States, from the appointment of Lieut. Maury as Superintendent of the U.S. Naval Observatory, in 1844, which led to the Maritime Conference held at Brussels in 1853. The numerous charts published by the American Office formed the basis of the useful wind charts subsequently issued by the Meteorological Department of the Board of Trade, during Admiral FitzRoy's lifetime, and which were widely distributed among seamen. The U.S. Hydrographic Office was established in 1866, and in 1893 there were nearly 3000 observers co-operating with it. The outcome of this was the publication of the Pilot Chart of the North Atlantic Ocean, to which we have often had occasion to refer. About 4000 copies of this chart are distributed monthly, and among other things they have done much towards bringing about the general recognition of the value of the use of oil to still the waves, by which numbers of vessels have been saved from total loss.

Bulletin of the American Mathematical Society (vol. i. No. 10, July 1895).—This closing number of vol. i. contains, in addition to the usual list of new publications and the index, a list of the published papers read before the Society during the year, together with the places of their publication.—Mr. J. M. Brooks gives a clear account of Lie's work on continuous groups *à propos* of Scheffers' edition of the Vorlesungen uber Continuirliche Gruppen mit geometrischen und anderen Anwendungen. "The importance of the group idea itself has long been recognised in its application to the theory of substitutions, and some continuous transformations, such as the pedal transformation, were in use before Lie's work, but were used without their connection with the group idea being discovered, and the discovery and the presentation of the results of it in a systematic form are due to Prof. Lie." Dr. Scheffers has aimed at giving in outline the general theory, and he indicates some lines in which it may be applied.—Prof. J. Harkness, in a review of the second volume

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(second edition) of Jordan's "Cours d'Analyse de l'école Polytechnique," which is devoted to the integral calculus, fully analyses its contents, and pronounces it to be "a substantially new contribution to mathematical literature." "From beginning to end the reader feels that he is being guided by a master-hand."—Prof. E. Hastings Moore writes on a theorem concerning p-rowed characteristics with denominator 2 (of Prym's "Untersuchungen über die Riemann'sche Thetaformel und die Riemann'sche Charakteristikentheorie," 1882).—A note on the Transitive Substitution Groups of degree 12, by Dr. G. A. Miller, mentions that Camille Jordan in the *Comptes rendus* (vol. lxxv. p. 1757) states that there are *three* primitive groups of degree 12, excluding the groups which contain the alternating group. Dr. Miller has found *four* multiply transitive primitive groups of this degree, excluding the two groups containing the alternating group The proof is given in the present note.

SOCIETIES AND ACADEMIES.

Paris.

Academy of Sciences, September 30.—M. A. Cornu in the chair.—The Perpetual Secretary read a letter from M. J. B. Pasteur, announcing the death of his father, Louis Pasteur, who died at Villeneuve-l'Étang (Garches), on September 28, 1895. M. A. Cornu then expressed the deep feeling of loss in the Academy, and recalled the greatness of the work accomplished by Pasteur. As a mark of respect and sorrow the Academy adjourned after receiving the correspondence.—Remarks on the subject of Lord Salisbury's discourse "on the real limits of our science," by M. Émile Blanchard. The author recalls his work in contradiction to the theory of the origin of species advanced by Darwin, and maintains that no single instance has ever been brought forward in answer to his challenge which can be held to verify the assumption that one species may be produced from another by any form of selection.—On glycosuria following ablation of the pancreas, by M. R. Lépine, The sugar contents of the urine have been determined, and glycosuria traced during the first thirty hours, operating on dogs without the use of anæsthetics or morphine.—A study of the mechanical theory of heat, by M. Ch. Brun, has been printed in the correspondence.—The evaporation of liquids and the great capillary theories, by M. G. Van der Mensbrugghe. Most liquids evaporate spontaneously in the air. The consequences follow: (1) The liquid layer whence particles are continually being detached to form vapour cannot have the same density as the liquid in the interior of the mass, otherwise there would be an abrupt passage from the liquid state to vapour; it must, therefore, be admitted that the density of the superficial layer decreases towards the exterior. All capillary theories, supposing liquids incompressible (Laplace), or of the same density throughout (Gauss), are therefore inadequate. (2) When the mass considered is very small (bubbles, liquid films), evaporation causes loss of a perceptible fraction of the total weight. Hence capillary theories regarding a liquid mass as having an invariable volume (Poisson) must be condemned. (3) The constant renewal of the free surface of the superficial layer proves, without possible doubt, that this layer is not in equilibrium. What confidence can then be placed in the theories of Laplace, Gauss, and Poisson, and the works of contemporary analysts (Neumann, Mathieu, Van der Waals, Resal, and Poincaré), who formally suppose a liquid mass in equilibrium? After calling attention to the defects of former theories, the author quotes his own theory, derived from a consideration of molecular forces, as giving a sufficient explanation of these consequences.—On a new nitrogenous manure, calcium cyanate, by M. Camille Faure. It is asserted that calcium cyanate can be produced in large quantity in the electric furnace by heating lime and charcoal intensely in an atmosphere of nitrogen, and oxidising the product by air. The cyanate contains a greater proportion of assimilable nitrogen than nitrate, and can be used as a manure.—Syntheses by means of cyanacetic esters, by M. T. Klobb.—Constitution of acids produced in the oxidation of inactive campholenic acids, by M. A. Béhal. The acid $C_6H_{10}O_4$ is dissymmetric dimethylsuccinic acid; the acid $C_7H_{12}O_4$ is one of the two dimethylglutaric acids having the two methyls attached to the same carbon atom, probably $CO_2H.C(CH_3)_2.CH_2.CH_2.CO_2H$. The author claims priority for his work against that of Tiemann.—On the effects of the synodic and anomalistic revolutions of the moon on he distribution of pressures in spring, by M. A. Poincaré.—On a double night ascension (balloon) made on September 4, by MM. G. Hermite and Besançon. Two balloons made voyages from Paris in opposite directions, starting at the same time. The currents observed and used are described, together with details of the voyages.

BOOKS, PAMPHLETS, and SERIALS RECEIVED.

Books.—A Hand-book to the Birds of Great Britain: Dr. R. B. Sharpe, vol. 2 (Allen).—Climbing in the British Isles: W. P. H. Smith and H. C. Hart, II. Wales and Ireland (Longmans).—Practical Proofs of Chemical Laws: V. Cornish (Longmans).—An Introduction to the Study of Seaweeds: G. Murray (Macmillan).—Catalogue of the Library of the Royal Geographical Society: Dr. H. R. Mill (Murray).—Dynamics: Prof. P. G. Tait (Black).—Farm Foods, or the Rational Feeding of Farm Animals: Prof. E. v. Wolff, translated by H. H. Cousins (Gurney).—The Gold Mines of the Rand: F. H. Hatch and J. A. Chalmers (Macmillan).—The Fauna of British India, including Ceylon and Burma; Birds, Vol. 3: W. T. Blanford (Taylor and Francis).—Popular History of Animals for Young People: H. Scherren (Cassell).—Moral Pathology: Dr. A. E. Giles (Sonnenschein).—The Splash of a Drop: Prof. A. M. Worthington (S.P.C.K.).—Simple Methods for detecting Food Adulteration: J. A. Bower (S.P.C.K.).—Biology Notes, Vol. 1 (Chelmsford) —Einführung in das Studium der Bakteriologie: Dr. C. Günther, Vierte Auflage (Leipzig, Thieme).—Natural History of Selborne: Gilbert White, 2 Vols. illustrated (Macmillan).—The Scientific Foundations of Analytical Chemistry: Prof. W. Ostwald, translated by Dr. G. M'Gowan (Macmillan).—The Structure of Man: Dr. R. Wiedersheim, translated by H. and M. Bernard (Macmillan).—Weather and Disease: A. B. MacDowall (Graphotone Company).—Old Farm Fairies: H. C. McCook (Hodder and Stoughton).

Pamphlets.—Les Limites Actuelles de Notre Science: Marquis de Salisbury, translated by W. de Fonvielle (Paris, Gauthier-Villars).—Reaction!: K. Pearson (Reeves).—Guide to the Collections of Rocks and Fossils belonging to the Geological Survey of Ireland: A. McHenry and W. W. Watts (Dublin, Thom).—A Supplement to a Revised Account of the Experiments made with the Bashforth Chronograph: F. Bashforth (Cambridge University Press).—Ein Brauner Tschimpanse im Dresdner Zoologischen Garten: A. B. Meyer (Berlin, Friedländer).

Serials.—Journal of the Royal Agricultural Society of England, Vol. vi. Part 3 (Murray).—Natural History of Plants: Kerner and Oliver, Part 16 (Blackie).—Mind, October (Williams and Norgate).—Transactions of the Perthshire Society of Natural Science, Vol. 2, Part 2 (Perth).—Geological Magazine, October (Dulau).—Morphologisches Jahrbuch, 23 Band, 1 Heft (Leipzig, Engelmann).—Bulletin de la Société Impériale des Naturalistes de Moscou, 1895, No. 2 (Moscou).—Geographical Magazine, October (Stanford).—Story of the Heavens: Sir R. S. Ball, Part 1 (Cassell).—Ethnologisches Notizblatt, Heft 2 (Berlin, Haack).—Bulletin de l'Académie Royale des Sciences de Belgique, 65^e Année, No. 8 (Bruxelles).—American Naturalist, October (Philadelphia).—Annals of Scottish Natural History, October (Edinburgh, Douglas).—Memoirs and Proceedings of the Manchester Literary and Philosophical Society, Vol. 9, No. 6 Manchester).—Science Progress, October (Scientific Press).—Illustrated Archæologist, and Reliquary, October (Bemrose).—Travaux de la Société des Naturalistes de St. Pétersbourg, Vol. xxiii. (St. Pétersbourg).

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